

## **SECTION 036241**

### **GROUT WORK**

#### **PART 1 – GENERAL**

##### **101. EXTENT**

- 101.1 Furnishing and installation of grout Work by the CONTRACTOR shall conform to the requirements of this Section and as required for the Work. The Work shall include, but is not limited to, grouting of the following:
- Column base plates
  - Conduit, piping, etc., through concrete floors or walls.
  - Post-installed anchor rods in concrete.
  - Post-installed equipment foundation pad dowels
  - Pipe support base plates.
  - Testing of non-shrink grout.
- 101.2 Equipment grouting by the CONTRACTOR shall be performed in accordance with the materials and procedures specified by the Equipment manufacturer. When the equipment manufacturer does not specify the requirements for equipment grouting, equipment grouting shall be in accordance with the provisions of this Section.
- 101.3 Grouting shall be performed by the CONTRACTOR using non-shrink grout, unless otherwise indicated on the drawings.

##### **102. REFERENCE DOCUMENTS**

- 102.1 Related standards, specifications, manuals, codes and/or other publications of nationally recognized organizations are referenced herein. Methods, equipment and materials intended to be used by the CONTRACTOR for grouting work shall comply with applicable or specified portions of referenced documents, in addition to Federal, State or local codes having jurisdiction.
- 102.2 References to these documents shall be to the issue date as adopted in IBC 2006. If the document is not referenced in IBC 2006, then the reference is to the latest issue date of the document together with the latest additions, addenda, amendments, supplements, etc. in effect on the date of contract award.
- 102.3 Unless otherwise indicated, references to the sponsoring agencies will be made in accordance with the abbreviations indicated.
- 102.4 ASTM—ASTM International.
- C 109—Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-inch or 50-mm cube specimens)
  - C 309—Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

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Specification G-5301  
Issue: Client Comments, Rev. 3  
September 8, 2011  
Project No. 12681-006

- c. C 827—Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
- d. C 939—Standard Test method for flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method)
- e. C 1107—Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)

### 103. SUBMITTALS

103.1 The CONTRACTOR shall submit the following documents in accordance with Section I – Contract Drawing and Data Requirements, to the DISTRICT prior to grout installation:

- a. Certification from manufacturer of non-shrink grout that product meets the requirements of ASTM C1107.

### 104. QUALITY ASSURANCE

104.1 CONTRACTOR shall engage an independent Testing Laboratory to inspect the grout work and to perform tests to verify compliance with the requirements specified herein. Such inspections and tests shall not relieve Contractor of responsibility for providing materials and procedures in compliance with the specified requirements.

### 105. TESTING

105.1 CONTRACTOR's independent Testing Laboratory shall make all cube specimens from fresh samples of grout taken on the Project Site. CONTRACTOR's Testing Laboratory shall maintain a complete and detailed record of the tests. Copies of the test results shall be submitted to the DISTRICT no later than (2) days after the tests are completed.

105.2 Extent of Testing:

- a. Each day that the grout is placed, the Testing Laboratory shall take a quantity of the prepared grout and mold six (6), 2-inch cube specimens per ASTM C109, Section 9, except as modified by ASTM C1107, Section 11.5.
- b. Additionally, each time a new lot of grout is initiated, mold six (6), 2 inch cube specimens as specified in paragraph 105.2a.

### 106. STORAGE

106.1 Materials shall be stored in such a manner as to avoid contamination, evaporation, or damage. Liquid admixtures shall be protected from freezing and temperature changes that would adversely affect their characteristics.

## **PART 2 – PRODUCTS**

### 201. MATERIAL

201.1 The CONTRACTOR'S grout specifications shall conform to ASTM C1107. Grout shall not contain metallic aggregate, oxidizing catalysts, gas-producing agents, nor more than 300 ppm chloride. Grout shall attain a one (1) day minimum compressive strength of 3500 psi per ASTM C109 and a minimum compressive strength of 5000 psi at 28 days. Grout shall conform to ASTM C1107 when mixed to a fluid consistency as prescribed by ASTM C827 at temperature extremes of 45° and 90° F with an

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extended working time of 30 minutes or more at temperatures between 45° and 90° F. Product may be one of the following:

	<u>MANUFACTURER</u>	<u>PRODUCT</u>
a.	BASF Master Builders	Masterflow 928 Grade B
b.	L&M Chemicals	Premier Grade C
c.	Five Star Products	Five Star Fluid Grout 100 Grade C
201.2	The CONTRACTOR may provide substitute product with the DISTRICT'S prior written approval.	
201.3	Curing Compound by the CONTRACTOR shall conform to ASTM C309, Type 1-D with fugitive dye (wax base not permitted). The product shall be compatible with and in accordance with the grout manufacturer's recommendations.	
201.4	For grout thickness greater than 3 inches, pea gravel or other approved filler shall be added to the grout. Such filler shall conform to the grout manufacturer's written requirements or recommendations.	

### **PART 3 – EXECUTION**

301. GENERAL
- 301.1 Grouting by the CONTRACTOR shall be performed promptly after the setting and leveling of the Equipment or column-bearing devices unless otherwise specified by the equipment manufacturer or indicated on the Design Drawings. If pockets, block-outs or anchor rod sleeves are exposed to weather or other sources of water and will not be grouted promptly during cold weather, when temperatures will be below freezing, they shall be protected from freezing by appropriate means such as heating, filling with propylene glycol antifreeze, closed-cell foam or other effective measures.
- 301.2 All structural base plates and mechanical/electrical equipment shall be firmly and solidly grouted in place utilizing non-shrink grout. Grouting shall be performed by methods that will ensure complete, uniform, and permanent filling of all space beneath the base without disturbing or displacing the alignment or level of the base in its correct position.
- 301.3 Shimming and Wedging:
- Shimming, wedging and leveling of equipment and column base plates is the responsibility of the Contractor who installs the equipment or column base plates.
  - During placement of grout all shims and wedges shall be removed after the grout has hardened, except for those shims and wedges required by the equipment manufacturer to be left in place.
  - Voids resulting from the removal of shims, wedges, and leveling screws, shall be filled in with the same grout used for grouting the equipment or structural elements.
- 301.4 Surface Preparation:
- Surfaces of hardened concrete upon which the grout is to be placed shall be chipped to remove unsound concrete, laitance, and surface mortar and expose the aggregate.
  - Hardened concrete surfaces shall be cleaned of loose materials and saturated with water for not less than two hours immediately before the grout is placed. All excess water shall be removed.

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- 301.5 Placing of Grout:
- a. Grout shall be placed in strict accordance with the requirements specified herein and the grout manufacturer's procedures.
  - b. Grouting shall be a continuous operation until the whole plate or base is completely grouted, except that shimmed and wedged areas shall be grouted as specified herein.
  - c. Special care shall be taken to ensure that space under the grouted plate or equipment is entirely filled with grout. Grout shall be poured from one side and continuously rodded with care until it flushes up to the top of the form on all other sides and through grout holes, if any, of the plate. Base plate with shear bars in more than one direction may be grouted through a central hole, only if air-relief holes are provided in the vicinity of the shear bars where air may be trapped.
  - d. Unless specified on design drawings, grout shall not extend above the bottom of the grouted plate and shall not extend beyond the edges of the grouted plate except as necessary to allow a 45 degree shoulder from the bottom edge of the plate to the top of the foundation.
  - e. Cold Weather Placing of Grout:
    - e1. When the surrounding temperature is below 45°F, grout temperature during placing shall be not lower than 55°F, and shall be in accordance with grout manufacturer's written instructions.
    - e2. The addition of calcium chloride or other accelerating admixture to the grout to prevent freezing and/or to develop earlier strength of grout will not be permitted.
  - f. Hot Weather Placing of Grout:
    - f1. Grout temperature during placing shall not exceed 75°F, unless otherwise indicated.
    - f2. Retarding admixture shall not be used unless otherwise indicated.
- 301.6 Non-shrink grout shall be furnished factory premixed so only water is added at the jobsite. Grout shall be mixed in a mechanical mixer for a minimum of 3 minutes or as specified in the manufacturer's written instructions. No more water shall be used than is recommended by the manufacturer.
- 301.7 Placement: Grout shall be placed immediately after mixing and before stiffening sets in. Grout shall be placed in strict accordance with the directions of the manufacturer so that all grout space is completely filled without voids. Forms shall be provided where structural components of base plates will not confine the grout.
- 301.8 Edge Placement: Grout shall be finished smooth in all locations where the edge of the grout will be exposed to view after it has reached its initial set. The edges of grout shall be cut off flush at the base plate or piece of equipment, except where a sloping surface is indicated.

END OF SECTION 036241

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